

## DISTRIBUTED COMPUTING & EMR: A LITERATURE SURVEY

PRITI B KALODE<sup>1</sup> & ASHISH SASANKAR<sup>2</sup>

<sup>1</sup>PCD ICSR, VMV College Campus, Wardhaman Nagar, Nagpur, Maharashtra, India

<sup>2</sup>G. H. Raisoni Institute of Information Technology, Nagpur, Maharashtra, India

### ABSTRACT

This paper reviews the research literature on electronic medical record (EMR) systems, how electronic medical records are defined, how the structure of these records is described, in what contexts EMRs are used, who has access to EMRs, which data components of the EMRs are used and studied, what is the purpose of research in this field, what methods of data collection have been used in the studies reviewed and what are the results of these studies.

**KEYWORDS:** Gleaning Systems, Distributed Computing, E-Medicine, E-Health, Ontological Approach, EMR, EHR, HMS

### INTRODUCTION

Over the past few years, information systems have become increasingly important in healthcare delivery. The use of computers in a wide range of medical applications and healthcare management is one potential alternative to reducing the overall costs of healthcare delivery. Further, the use of sophisticated decision support systems is envisaged to improve quality of clinical decision making. While hospitals and other health organizations have information systems departments to handle and process the continuous flow of information, from patient to insurance data, and universities (particularly medical schools) are attempting to develop curriculum in healthcare information systems, research in design, implementation and use of information systems in healthcare has been somewhat limited to medical schools and healthcare providers. A literature review of mainstream MIS and Management Science journals clearly indicates that healthcare information systems research has not been accepted entirely into the MIS field. Thus, there is a need to identify and develop a framework [1].

There is a growing need for sharing patient records among health care providers and their associated facilities, in order to provide the best care and clinical outcomes for patients. Due to the increasing use of information technologies in health care industries, patient records are often produced and shared in an electronic form. In distributed computing systems data is stored on many computers across an enterprise and even outside of the enterprise. The results of data being stored in and transmitted to numerous places are massive and information system professionals recognized that data security would be an issue that had to be addressed with new solutions and new technologies [2].

### BACKGROUND

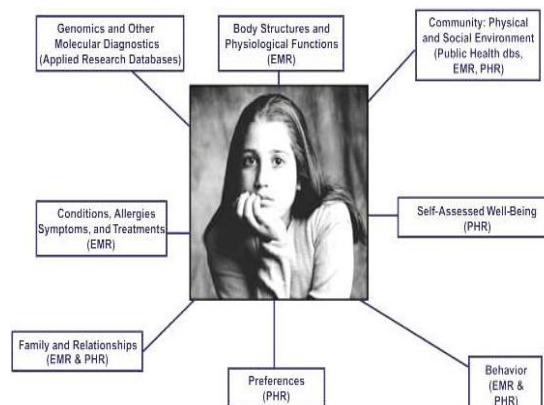
Medical practices have been contemplating the prospect of moving from paper-based records to electronic medical record (EMR) systems for decades. But relatively few have begun taking steps to make the transition. The following point's highlights why we need to move from paper based record to Electronic medical record:

- [Evans et al., 1994] suggested that information technology will have enormous impacts on health care, the more profound effects on health may well be due to the impact of IT on the broader determinants of health, since it is now widely recognized that health care is not the most important determinant of health.

- **[Dr. Indika Ranasinghe]** suggested that there are six common characteristics of Health Information Systems (HIS) in developing countries: No integration of various sub components of information, Redundancy in the data collected, Data being irrelevant and of poor quality, Information is not linked to a reference population, Information management is often heavily centralized in the system, inadequate infrastructure
- **[Vickery 1995]** suggested that within the health area, Knowledgeable and empowered people can increase their personal responsibility for what the author refers to as “self-health care” – making choices and taking actions so as to maintain and improve their own health. They can also increase their potential for what he calls “self medical care” – self – diagnosis and self treatment. As expert systems become more sophisticated and more widely available, the potential for patient to take a far more active role in their own disease management increases, which has significant implications for the role of professionals in the future. Already learning about health and health care is one of the most common reasons for people to turn to the World Wide Web, and sales of health related information technology and home – based health care tests and services are a major growth industry. While the potential for abuse exist, quality control should ensure that such technology is beneficial in the future.
- **[Bernd B 1997]** suggested that there is a need to integrate the disparate, heterogeneous healthcare information systems to improve collaboration between different healthcare departments.

## LITERATURE SURVEY ON EMR DATA

A literature survey has been done and we observe that there are different databases for different reasons as shown in figure 1.



**Figure 1: The Required Data Sources**

As a result, it has become difficult to exchange EMR across different systems and to have a unified information system to deal with one EMR per individual, irrespective of the time and place of treatment of an individual.

## PURPOSE OF RESEARCH

The development of EMR systems presents a unique opportunity to support and further the nation’s health research enterprise. To date, the utility of health information networks has been seen as related primarily to reducing healthcare costs, limiting medical errors, and generally improving the standard of care. While these benefits are important, there is another critical element in the healthcare continuum that could greatly benefit from the development of EMR systems: medical research. Studying large samples of medical records or clinical datasets could be an essential step toward understanding the etiology and progression of disease, treatment methods, and outcomes across varied populations and disease groups [7, 8].

This leads to the development of a system in which with interpolating clinical ontologies & EMR Environment the new set of references are derived which will be beneficial in understanding the complex behaviour of the EMR in distributed database environment.

## **OBJECTIVE**

With the existence of n-no of technologies to formulate the EMR & varied methods for calculating the Patient Epidemic Index the need for formulating a systematic semantic approach for resonance of EMR has to be derived in context with Clinical Ontologies. To bridge this gap the research will be carried out to formulate the methods & simulate the results.

The research will be carried out in two phases. In the first phase, the main focus will be on accumulation of statistical data from EMRs. The main objective in this phase is to study how diseases spread both in geographical and chronological order. This objective requires an infrastructure that enables this kind of data extraction from geographically disperse and heterogeneous EMRs.

The second phase will concentrate on EMR data extraction. This requires access to EMRs and transference and integration of confidential patient records. Ethical problems arising from issues related to privacy will also be considered. The second phase calls for an infrastructure that handles identification, transference and integration of confidential patient data.

## **EXTRACTION OF ELECTRONIC HEALTH RECORD DATA**

To manage the public interests in health services, local and national health authorities need updated and precise information on use of medical resources, medication, epidemics, etc. Today, this information is at the best incomplete and outdated. For medical doctors and health personnel in general, access to updated and complete patient records is vital for an optimal patient diagnosing and treatment. Today, vital patient data at the GPs offices is unavailable for hospital doctors and medical specialists, or to medical emergency units. In India we have one EPR for home-based caring services, two EPR system providers for GPs and three EPRs for hospitals. No standard data format exists, which means that all EPRs have their own data formats. This calls for a system that can manage different data formats.

As a result of lack of standards and systems for secure integration of patient data, statistical data have been registered manually.

For some of the EPR systems, statistical modules exist. However, they do not support electronic interpretation and grouping, and they are not widely distributed. In addition, the implementation of regional and national computer networks for health institutions enables integration of EPR data.

## **CONCLUSIONS**

The application of information technology to patient records offers the promise of new knowledge that can be obtained only by integrating and analyzing data extracted from hundreds if not thousands of patient records, including clinical information, medical images, environmental profiles, and genetic analyses, combined with new findings from molecular and genomics research. As institutions struggle with the adoption and implementation of EMR systems, it is crucial that they consider the needs and seek the advice of the research community.

Importantly, improvements made in EMR systems in response to research needs will ultimately serve clinical care needs as well. For example, in trying to achieve consistency and standardization, patient record systems will not only become more useful for research but will also contribute to improved quality of patient care.

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